

Original Article

Physical condition of preschool children with disabilities in psychological and physical development

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Abstract.

Introduction. Today, there is a negative tendency of increasing the number of preschool children with disharmonious psychophysical development in Ukraine (55.9% in 1998, 59.4% in 2005). At the same time, society offers actual solutions of this problem. Under certain conditions, the development of preschool children of this category can improve or approach to healthy peers' development level, and within existing educational systems, this process can be managed. Therefore, it is important to study the indicators of physical condition children with special needs in order to substantiate preventive and health measures, determine the content of physical exercises for correction of their psychophysical development. *Methods:* analysis, generalization of literary sources data; pedagogical ascertainment experiment; medical and biological methods; methods of mathematical statistics. *Purpose.* To determine physical condition indicators of preschool children with disabilities in psychophysical development. *Result and discussion.* The value of morbidity children with disabilities of both genders, regardless of the defect, indicate unsatisfactory level. At the surveyed children was noted deterioration of the cardiovascular system functional conditions, that characterized by a slight increase in resting heart rate. Most of the surveyed children reported unsatisfactory quality of cardiovascular system regulation (92.0% girls, 75.8% boys). The values of endurance coefficients of the surveyed children with special needs, regardless of the defect, indicate a weakening of the cardiovascular system. External respiratory indicators of children with speech disorders, mental retardation, Down syndrome and autism spectrum disorders correspond to a level below average. Only peers with musculoskeletal disorders have an average level. *Conclusions.* The biological age of the surveyed contingent corresponds to the passport. It has been confirmed that the development of children with psychophysical disabilities is conditioned by the lag of the normative in most indicators. This leads to functional impairment of some physiological systems. It is was found marked decreasing in cardiovascular and respiratory system activity children with autism spectrum disorders, Down syndrome and with mental retardation.

Key words: peers, cardiovascular system, respiratory system, approach, indicator.

Introduction.

The health of a nation is determined primarily by the health of children. This is the most important resource of any society (Efimenko, 2013; Nedilko & Rudenko, 2013; Prystupa, Petryshyn & Bodnar, 2013; Pityn, Pasichnyk, Galan, Melnyk & Semeryak, 2018). Formation of preschooler's health, full development of organs and his body systems are important tasks of preschool educational institutions (Pasichnyk, Pityn, Melnyk, Semeryak, & Karatnyk, 2018).

The dynamics of the children's population health in our country has become negative (Dalen, Ingvaldsen, Roaas, Pedersen, Ingebrigt, & Aune, 2017). There is a growing number children with disabilities as well as children with chronic pathology. Now, about 50% of children under the age of 6 years have prenosological morphological and functional abnormalities. Psychophysical development of modern preschoolers is characterized by a tendency to the increased number of children with disharmonious psychophysical development (in 1998 - 55.9%, in 2005 - 59.4%) (Nedilko & Rudenko, 2013; Shafransky, 2016). This largely applies to children with psychophysical retardation due to impaired activity of various or several analyzers (visual, auditory), with organic damage of central nervous system (CNS), with mental retardation (MR), speech disturbances, musculoskeletal disorders, behavior disorders, emotional abnormalities, and severe multiple disorders (Nedilko & Rudenko, 2013; Shafransky, 2016).

Preschool education is optimal for the inclusion of children who require correction of psychophysical development into the general education environment. It is so because at this time the acceptance of various personal manifestations is forming easier and quicker. In particular, preschool children stop distinguishing differences between people, actively master cultural skills and abilities, etc. much faster than adults do (Mavilidi,

Okely, Chandler, Cliff, & Paas, 2015; McNeill, Howard, Vella & Cliff, 2020). Moreover, under certain conditions, the development of preschool children, who need correction of psychophysical development may equalize or approach the level of development of healthy peers, and within the existing educational systems, this process can be managed (Prystupa et al 2013).

Today, studies related to the development of approaches, directions, methods, etc. of working with children who have disorders of psychophysical and intellectual spectrum are important and relevant. In particular, such scientists as der Fels, te Wierike, Hartman, Elferink-Gemser, Smith, & Visscher (2015) have focused on the relationship between motor and cognitive skills of children of different ages with developmental disorders. Other specialists (Wouters, Evenhuis & Hilgenkamp, 2020) today deal with studying physical fitness of children of different ages with moderate and severe intellectual disabilities. The researchers (May, Chan, Lindor, McGinley, Skouteris, Austin, McGillivray & Rinehart, 2021) are also studying the impact of dance on the diverse abilities of children with disabilities. In general, including these works, there are significant number of modern scientific papers on the issues of children with special needs. This means that modern society, both at the scientific and practical levels, tries to socialize children with disabilities properly, to create opportunities for their rational physical development, provide decent living conditions and prospects for their future.

Physical education is an important part of inclusive education. It contributes to the formation of a number of positive personality traits and physical improvement, and naturally combines not only biological, but also social aspects (Carson, Hunter, & Kuzik, et al., 2016). Physical education is designed to promote the use of psychophysical capabilities of the child's body for self-realization in society (Garvey, 2018; Kyriakos, 2020). This is possible by means of rationally organized motor activity, using saved functions, residual health, and natural physical resources. In the context of the above, the study of indicators of physical condition is important for substantiation of preventive and wellness measures, determination of physical exercises content to correct the psychophysical development of children with special needs.

Purpose of the research. To determine physical condition indicators of preschool children with disabilities in psychophysical development.

Material and methods.

The following research methods have been applied in the paper: general scientific (analysis, generalization of literary sources data); pedagogical (ascertaining experiment); medical and biological. The program included anthropometric studies that were conducted according to conventional methods. In our research, we determined the body weight (kg), body height (cm), chest circumference (cm), head circumference (cm), wrist dynamometry of the leading arm (kg). The hand muscles strength was measured using a child wrist dynamometer (DRP-30) according to the conventional methods. The child got into the starting position: standing, hands down, and on the signal he/she squeezed the dynamometer as much as possible by the leading hand, taking it aside. There were two attempts. Children had 1-2 minutes to rest between the attempts. The measurement results were recorded with an accuracy to 0.1 kg. All anthropometric measurements were carried out in accordance with generally accepted rules and requirements of anthropology. A height meter was used to determine the body height, medical weight - the body weight. A measuring tape was used to measure chest and head circumference. The physical development assessment of children was made by comparing their individual indicators with the average age standards. The biological age and the Quetelet index were calculated based on the obtained indicators. In determining the biological age of the studied cohort of children, we used the ratio of head circumference to body height and performed appropriate calculations. The obtained data were compared with the indicators of biological age of the assessment scale of the physical fitness of preschool children. The Quetelet index (QI) was used to determine the body weight (BW) to height (H), which was calculated by the formula $QI = BW / H$. The study of acute respiratory diseases duration per year was carried out on the basis of copying from medical records and visit logs. Evaluation of hemodynamics was performed according to the data of palpatory heart rate monitoring, tonometry by auscultation Korotkoff method, with the determination of: heart rate (HR), systolic (SBP), diastolic (DBP) and pulse (PBP) blood pressure. The Robinson index was used to determine the reserve-functional capacity of the cardiovascular system that characterizes the systolic work. The Robinson index was calculated using the formula: $HR \times SBP/100$ (relative units). RI values were distributed by reserve levels (the lower the index value at rest, the higher the maximum aerobic capacity of the body): low - more than 96 RU, below average - 86-95 RU, average - 76-85 RU, above average - 71-75 RU, high - less than 70 RU. A complex indicator that reflects the level of adaptive capacity of the child's body is the adaptation index based on regressive ratios of heart rate, systolic and diastolic blood pressure, age, body weight and height. All these indicators play a significant role in the formation, consolidation of the adaptive activity of the body, and the levels of their regressive relationships can characterize the level of adaptation of adaptive potential (AP) in general according to Baevskiy & Bersenev (1997). Assessment of the AP level was carried out in four stages, developed for the child cohort: satisfactory adaptation up to 1.89; adaptation stress from 1.90 to 2.14; unsatisfactory adaptation - from 2.15 to 2.41; failure of adaptation - above 2.41. Respiratory rate (RR) was calculated by movement of the chest or abdomen unnoticed for the child being examined (due to possible attempts to slow down or speed up the rate of breathing with a conscious understanding of testing). Respiratory rate was calculated per 1 minute (researcher put their palm on the chest or

abdomen to facilitate the counting of breathing cycles). Quantitative indicators of the brachial index were used to determine the degree of kyphotic posture. For this purpose, the width of the shoulders (the length between the shoulders points measured in front) and the shoulder arc (the length between the shoulders points measured in the back) were measured. We have used the method of Tupchiiy (2001) in the study. It provides a way to assess the physical condition of preschool children. Participants. The study involved fifty-four 5-6-year-old children (25 girls, 29 boys). They needed correction of psychophysical development, among them: 9 – with musculoskeletal disorders (MSD), in which motor impairment was not visible (gross walking, jogging, jumping disorders), 15 with speech disorders (SD), 16 with mental retardation (MR), 5 with Down syndrome (DS), 9 with autism spectrum disorders (ASD). Organization of research. The research was conducted on the basis of preschool educational institutions of Lviv and Lviv region, in which there are groups of compensatory and inclusive type.

Statistical analysis. Statistical processing of the obtained data was carried out with the use of a standard Microsoft Excel software package.

Results.

Physical condition is manifested in the formation and change of biological forms and functions of the child's body in the course of life. Physical condition is determined by a set of morphological features of physical development, biological and calendar age compliance or mismatch, functional indicators of separate body systems, state of health determined by the level of nonspecific immune resistance, indicators of posture formation (15).

Table 1 presents physical condition indicators of 5–6-year-old girls and boys with psychophysical development disorders.

Table 1. Physical condition indicators of 5–6-year-old children with psychophysical development deviations, n=56

Indicators	Sex	1	2	3	4	5
Body height, cm	G	116,45±1,25	116,85±3,07	115,00±2,08	113,00±1,00	116,25±2,06
	B	121,00±4,18	114,37±10,79	116,44±6,32	114,50±3,53	116,00±3,93
Body weight, kg	G	17,75±1,50	20,35±1,67	18,41±2,78	17,66±1,52	19,60±2,05
	B	20,06±3,38	21,00±4,20	19,70±1,50	17,90±1,55	22,86±6,01
Chest circumference, cm	G	55,87±1,45	57,71±1,99	55,42±3,40	56,66±3,05	56,50±2,12
	B	56,70±2,38	56,87±4,54	55,66±3,67	59,50±2,12	61,40±7,76
Head circumference, cm	G	52,12±2,52	51,64±1,74	49,78±2,27	53,66±1,52	49,25±0,97
	B	50,20±1,48	51,50±1,19	50,33±2,06	53,00±1,41	52,20±3,21
Body mass index, RU	G	152,69±12,97	174,07±11,56	160,01±23,10	156,42±14,85	168,66±17,95
	B	162,30±23,24	182,19±21,76	169,16±8,93	156,19±8,76	196,16±46,10
Biological age, RU	G	44,83±1,97	44,19±1,14	44,30±2,15	47,99±1,54	44,36±0,50
	B	43,59±0,67	45,32±3,72	43,56±1,25	46,32±2,66	44,97±1,73
Wrist dynamometry (leading arm), kg	G	5,25±0,49	5,58±0,90	4,57±1,58	5,50±0,35	4,00±0,42
	B	5,42±0,65	6,42±0,70	4,88±0,71	6,10±0,42	4,14±0,75
Duration of acute respiratory diseases, days per year	G	18,75±2,75	18,57±2,57	23,19±4,64	19,33±1,52	24,50±3,41
	B	19,00±2,12	18,62±2,26	21,00±3,53	20,00±2,82	21,20±3,53
Shoulder arc, cm	G	31,87±1,03	33,57±1,61	31,71±2,05	33,33±1,52	31,50±1,73
	B	32,00±1,58	33,62±1,30	32,33±1,32	33,00±1,41	32,80±0,83
Slouch back index, %	G	74,75±0,95	81,57±2,43	76,28±2,05	77,66±2,51	77,25±2,21
	B	75,8±2,58	80,12±2,03	77,00±1,73	76,00±1,41	78,00±1,58

Note: 1 - children with musculoskeletal disorders; 2 - with disorders of speech development; 3 - mental retardation; 4 - with Down syndrome; 5 - with autism spectrum disorders.

Physical development is a continuous process and its harmony is one of the most important indicators of health (Krutsevich, Vorobiov, & Abyss, 2011). Such indicators as body height, weight, chest circumference, as well as the calculation of somatometric data and anthropometric index have been considered for its evaluation.

The analysis of the obtained body weight and height characteristics of preschool children with psychophysical disabilities did not reveal their lagging behind the established normative values for persons of the appropriate age and sex (Krutsevich et al, 2011). The obtained indicators of the head circumference were within the normative values in all examined children (Tupchiiy, 2001; Patricia, Kyriaki & Chronoula, 2019).

An important indicator for assessing physical development is chest circumference. Its value closely correlates with the functional indicators of respiratory and cardiovascular systems. Thus, according to our data, the chest circumference indicator was in the range of 55.42–57.71 cm in girls and 55.66–61.40 cm in boys. These results coincide with the age parameters (Krutsevich et al, 2011). Thus, according to a number of physique indices (height, weight, chest circumference), the surveyed children with special needs have an average level of physical development according to the table of standards (Krutsevich et al, 2011).

There were no serious deviations from the normative values (Tupchiiy, 2001) in children with psychophysical disorders in the indicators of height and weight index. The registered values of this index in girls with SD and ASD were average, but for their peers with MSD, MR and DS these indicators were slightly lower and corresponded to a level below average. Among the surveyed cohort of boys, the largest number of children (SD, MR, ASD) with an average level of Quetelet index were observed. Only boys with MSD and DS had lower than

average level of Quetelet index. Determination of biological age in combination with physical development indicators allows us to more accurately assess the level of health and physical capabilities of the main body systems of preschoolers. The biological age is a complex notion. It reflects the individually achieved level of morphological and functional maturity of separate tissues, organs and holistic body development (Lundbäck, & Fälth, 2019). At the same time, N. Tupchiy (2001) offers to evaluate the biological age of 5-6-year-old children in terms of the ratio of head circumference to body length. The analysis of the received data allowed stating that the average biological age was in the range of 44.19-47.99 RU in girls with psychophysical development disorders, while in boys that indicator was from 43.56 to 46.32 RU, respectively. It testifies to the average level of biological maturation (Tupchiy, 2001; Maelan, Tjomslan, Samdal, & Thurston, 2019). Therefore, we can argue that the biological age of the studied cohort of preschool children corresponds to the passport age.

Among the important characteristics of the child's musculoskeletal system development is the wrist dynamometry. In particular, the studied children showed the indicator of the wrist strength in the range of 4.00-5.50 kg in girls and 4.14-6.10 kg in boys. According to this indicator, all surveyed children with psychophysical disorders have the indicator of wrist muscle strength of the leading hand below the norm. This indicates a low level and developmental delay of the children's musculoskeletal system. It is known that the body's resistance to adverse factors is evaluated by the number and duration of acute respiratory diseases that the child had in the previous year (Cobley, Abraham & Baker, 2008; Mainstone-Cotton, 2017). The obtained data showed that the incidence of diseases in the surveyed children ranged from 18.57 to 24.50 days in girls and from 18.62 to 21.20 days in boys. The estimate of the number of days per year missed in connection with acute respiratory diseases in girls and boys with psychophysical disorders is 2 points and indicates a level below average (Tupchiy, 2001).

In the course of the research, we have found out that all surveyed girls with psychophysical disorders were characterized by a low value of the brachial arc (31.50–33.57 cm). A similar situation could be observed with the boys (32.00–33.62 cm). It should be noted that children with SD and DS have a lower than average level of shoulder arc value. Other children with disabilities have a low level (Tupchiy, 2001; Maelan et al, 2019).

Calculation of the slouch back index in children with special needs made it possible to find out that girls and boys with MSD, MR, DS and ASD are characterized by a high degree of slouch back. The values of slouch back index correspond to the average level only in children of both sexes with MSD. Lower than average ranges are inherent in children with MR, DS and ASD. The most noticeable low values of the slouch back index were recorded in children with MSD (Tupchiy, 2001). In general, this can be explained by the fact that older preschool age is a critical period of development, which is characterized by accelerated growth rate.

Universal indicators of adaptive processes in the body, based on which we can predict its functional condition and further development of the main functional systems, are indicators of cardiovascular and respiratory system (Garvey, 2018). It was proved (Baevskiy, & Bersenev, 1997) that the functional and reserve capabilities of the cardiovascular and respiratory systems are the basis for the formation of adequate compensatory reactions of the body to environmental influences. The results of cardiovascular and respiratory systems functional testing of the surveyed cohort of children are shown in Table 2.

Table 2. Indicators of cardiovascular and respiratory systems of 5-6-year-old children with psychophysical disorders, n = 54

Indicators (st. characteristics)	Girls (n=25)					Boys (n=29)					
	Psychophysical disorders										
	MSD	SD	MR	DS	ASD	MSD	SD	MR	DS	ASD	
HR, beat per min.	\bar{x}	97,00	91,85	99,70	99,00	100,00	92,00	93,62	100,88	99,50	99,20
	S	2,58	2,73	5,31	1,00	4,32	2,82	4,59	3,62	2,12	4,60
SBP, mm Hg.	\bar{x}	97,00	95,42	101,85	102,66	103,50	94,40	90,50	98,55	103,00	99,60
	S	6,83	6,29	3,93	7,57	5,74	3,84	3,25	5,50	1,41	2,96
DBP, mm Hg.	\bar{x}	60,25	61,00	68,71	68,00	66,25	61,80	57,12	66,11	67,00	65,80
	S	3,86	8,66	4,34	2,00	2,62	5,06	3,94	4,93	4,24	5,26
PBP, mm Hg.	\bar{x}	36,75	34,42	33,14	34,66	37,25	32,60	33,37	32,44	36,00	33,80
	S	6,07	7,95	4,41	6,11	3,59	3,64	2,97	3,77	2,82	3,70
RI, RU	\bar{x}	94,09	85,45	101,56	101,64	103,50	86,78	84,65	99,52	102,48	98,82
	S	5,64	7,32	6,28	7,42	7,37	2,40	3,47	7,97	0,77	5,49
AP, RU	\bar{x}	1,83	1,77	2,01	2,02	2,02	1,73	1,72	1,96	2,01	1,98
	S	0,10	0,14	0,09	1,10	0,11	0,08	0,09	0,13	0,01	0,10
EC, RU	\bar{x}	27,07	28,20	30,69	29,21	27,02	28,52	28,19	31,42	27,63	29,65
	S	5,52	7,77	5,48	5,56	2,77	3,52	2,11	3,33	1,58	3,75
RR, cycles per min.	\bar{x}	23,00	23,85	24,28	26,00	24,25	23,30	23,62	24,17	25,00	24,00
	S	0,81	1,34	1,49	1,00	0,95	1,14	1,50	1,39	1,41	1,58

Note: MSD - musculoskeletal disorders; SD - speech disorders; MR - mental retardation; DS - Down syndrome; ASD - autism spectrum disorders.

We have found that the resting heart rate in girls was in the range of 91.85–100.00 beats per minute, in boys - 92.00–100.88, respectively. As we can see from the table, the average heart rate corresponds to appropriate indicators in children with MSD and SD. At the same time, children with ASD, DS and MR have slightly higher heart rate than the age norm for both sexes.

According to the analysis of surveyed cohort, it was found that the average values of SBP (90.50-103.50 mm Hg) and DBP (57.12-68.71 hg) were within the age norm. The values of children' PBP, at the same time, ranged from 32.4 to 37.25 mm Hg.

To quantify the energy potential of the child's body, a reserve indicator was used - Robinson index, which characterizes the systolic work of the heart.

Comparison of the average values of the Robinson index with the rating scale (Vetoshkina & Klyuchnikova, 2009) shows that the results of girls and boys with DS, ASD and MR correspond to a low level. Children with MSD have a below average level of cardiovascular system regulation. An average index level was established only for children with SD.

We distributed children with psychophysical disorders according to the Robinson index for more detailed analysis (Fig. 1). The obtained data indicate that only at 8.0% of girls with special needs showed a satisfactory quality of cardiovascular system regulation at rest, the remaining 92.0% of the surveyed of this sex group - unsatisfactory. The following was observed among the boys with psychophysical disorders: 24.2% had satisfactory quality of cardiovascular system regulation, and 75.8% - unsatisfactory, respectively. It should be noted that there were no children with high and above average levels of cardiovascular system regulation among the surveyed.

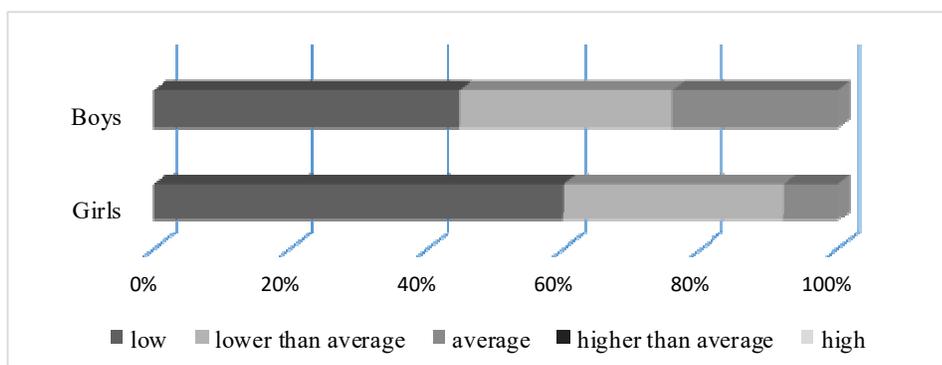


Fig. 1. Distribution of children with psychophysical disorders according to Robinson's index

It is known that the ability to withstand adverse environmental factors is largely determined by the reserve body capacity (Wilczkowski, 2012). This fact caused the need to study the adaptive potential of the cardiovascular system of children with various psychophysical disorders.

The obtained results revealed a decrease in the adaptive capacity of the cardiovascular system in children of both sexes with MR, ASD and DS (1.96–2.02 RU). Those results are primarily caused by decrease in the functional reserves of their physiological systems. However, girls and boys with MSD and SD have a satisfactory adaptation level (1.72-1.83 RU). As we can observe from the above data, the results of evaluating the level of adaptive capacity of children with different nosologies do not differ on the basis of their sex.

The analysis of the adaptive potential values revealed that among all surveyed children with psychophysical disorders 36.0% of girls and 55.2% of boys had a satisfactory level of adaptive capacities, 56.0 5% of girls and 41.3% of boys - had tense adaptation, while 8.0% and 3.5% respectively - unsatisfactory adaptation (Fig. 2). It is noteworthy that no child has been found to have any adaptation failure among the surveyed group.

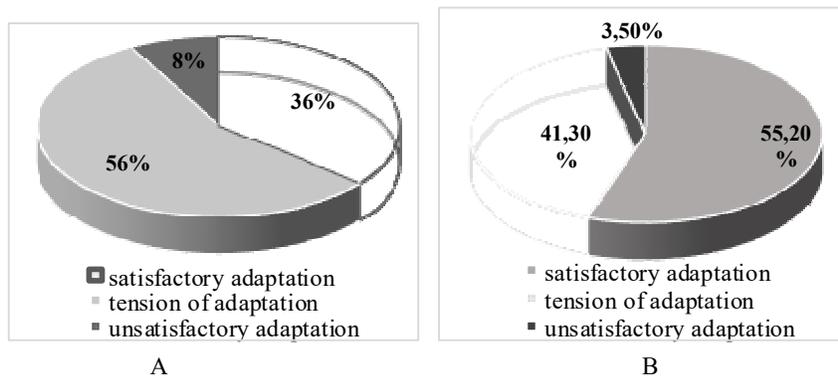


Fig. 2. Distribution of children with psychophysical disorders according to adaptive potential value (A – girls, B – boys)

An important indicator of cardiovascular system evaluation is endurance coefficient (EC). In normal condition in older preschool children, it should be equal to 23-25 RU. An increase in the value of this indicator relative to the norm indicates a weakening of the cardiovascular system function, a decrease – to strengthening. In general, the average endurance coefficient of the surveyed children with special needs of both sexes, regardless of the disability, indicates a weakening of the cardiovascular system functioning. The division of girls and boys with psychophysical disorders by the value of endurance coefficient is presented in Figures 3–4.

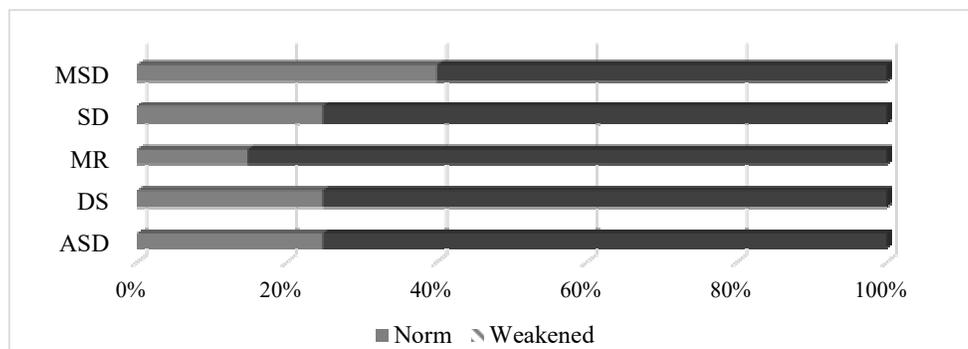


Fig. 3 Distribution of girls with psychophysical disorders according to value of endurance coefficient, %

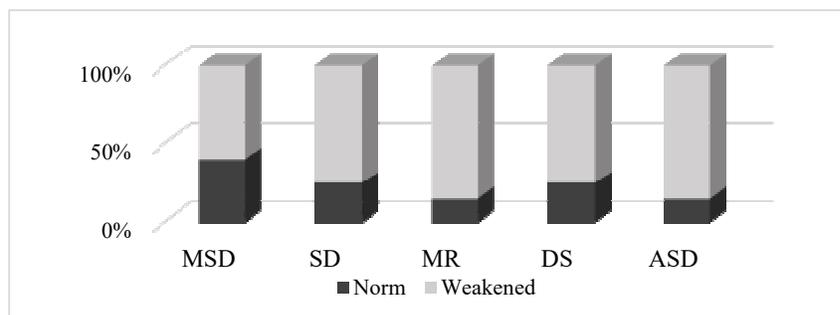


Fig. 4 Distribution of boys with psychophysical disorders according to value of endurance coefficient, %

According to the survey, the RR was within the normal range (Wilczkowski, 2012) in girls and boys with MSD and in average was equal to 23.00 ± 0.81 movements per minute and 23.30 ± 1.14 movements per minute, respectively. The RR in children with SD was slightly higher, namely 23.85 ± 1.34 movements per minute in girls and 23.62 ± 1.50 movements per minute in boys. These values are almost no different from peers' indicators without psychophysical disorders. The highest RR values are inherent for girls and boys with DS (26.00 ± 1.00 movements per minute and 25.00 ± 1.41 movements per minute, respectively). The obtained RR values of children with MR and ASD exceed the average normative values and are in the range of 24.00–24.28 movements per minute.

When comparing the functional indicators of the respiratory system with the rating scale (Wilczkowski, 2012), it was found that the results of girls and boys with MSD correspond to a score of 3 points, and girls and boys with SD, MR, DS and ASD - 2 points. Thus, children with MSD have an average level of the respiratory system functionalities, and children with SD, MR, DS and ASD have below average level, respectively.

Discussion.

According to numerous studies, the physical education process of preschool children with psychophysical distractions should provide maximum conditions for the full development of these category children. There is also a need of correction the existing manifestations of dysontogenesis in them (Efimenko, 2013; Glushchenko et al, 2013; Pasichnyk et al, 2018). In the course of the research, we confirmed that the features of development of children with psychophysical disabilities are caused by lagging behind the norm in most indicators (Efimenko, 2013; Pityn et al, 2018; Maelan et al, 2019). This, in turn, leads to functional impairment of some physiological systems. The observed decrease in the functional condition of the motor analyzer in children with psychophysical disabilities, which arises due to limited motor activity, leads to a reduced performance of the cardiovascular and respiratory systems. Children with psychophysical disabilities, compared with healthy peers, have respiratory, heart rate and morbidity rates throughout the year that are more frequent. The decrease in the functional condition of the motor analyzer in the surveyed children leads to a weakening of functional activity of the cardiovascular system of the body during exercise Baevskiy, & Bersenev, 1997; Adamo, Wilson, Harvey, et al., 2016).

Our experimental material supplements the data of other authors on the most pronounced weakening of cardiovascular and respiratory system activity in children with autism spectrum disorders, Down syndrome and mental retardation. The detected deviations indicate the presence of motor disorders caused by organic lesions of the central nervous system, disorders of the intellectual, emotional and volitional sphere, low level of perception, processing of motor material (Pasichnyk et al, 2018).

The conducted research supplements and confirms the scientific information that development and teaching of children with special needs should take place under the influence of natural and purposeful correction and pedagogical process (Nedilko, & Rudenko, 2013; Prystupa et al, 2013; Pasichnyk et al, 2018; Pope, Zeng, Gao, 2017). In fact, the process of physical education, which is organized with the account of a differentiated approach to every child with psychophysical disabilities, will successfully solve the problem of correction of their psychophysical development and integration into society.

Conclusions.

The results of studying the physical condition indicators of 5–6-year-old children with abnormalities in psychophysical development showed that children of the studied category do not lag behind their healthy peers by main anthropometric indicators. It has been established that their biological age corresponds to the passport one. The disease incidence rates of children with special needs of both sexes, regardless of the disability, indicate an unsatisfactory level. The vast majority (MSD, MR, DS, ASD) of the surveyed girls and boys are characterized by a slouch back, except for children with SD. As a result of the research, an impairment of the cardiovascular system functional conditions has been found, which is characterized by a slight increase in heart rate at rest. An unsatisfactory quality of cardiovascular system regulation (92.0% in girls, 75.8% in boys) was reported in most of the surveyed children. Reduced adaptive capacity of the cardiovascular system was found in children of both sexes with MR, ASD, and DS, while a satisfactory level of adaptation was found in their peers with MSD and SD.

The values of endurance coefficients of the examined children with special needs, regardless of the defect, indicate cardiovascular system weakening. External respiratory system indices (RR) in children with MR, SD, DS and ASD are below the average level. Only peers with MSD have an average level of this indicator.

The obtained results give grounds to state that the level of physical condition of preschoolers with psychophysical developmental disabilities has characteristic lags from the normative values for children of this age group. At the same time, it can be adjusted properly by using rationally selected means and methods of physical education. At the same time, when selecting these means and methods it is important to take into account the type of defect in the psychophysical development of the child, the individual functional capabilities of his/her body, and, accordingly, a differentiated approach to learning and development of this cohort.

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